### tables % for examples

##crosstab 1: colours and feelings

str(data)

feelings\_table<- table(data$FEELING, data$COLOUR12)

feelings\_table<- prop.table(feelings\_table, 1)\*100

round(feelings\_table, digits = 2)

###crosstab 2: countries and colours

countries\_table<- table(data$COLOUR12, data$COUNTRY)

countries\_table <- prop.table(countries\_table, 1)\*100

round(countries\_table, digits = 2)

###crostab 3: colours and feelings, by country

US\_feelings\_table<- table(American$FEELING, American$COLOUR12)

US\_feelings\_table<- prop.table(US\_feelings\_table, 1)\*100

round(US\_feelings\_table, digits = 2)

UK\_feelings\_table<- table(British$FEELING, British$COLOUR12)

UK\_feelings\_table<- prop.table(UK\_feelings\_table, 1)\*100

round(UK\_feelings\_table, digits = 2)

HK\_feelings\_table<- table(HK$FEELING, HK$COLOUR12)

HK\_feelings\_table<- prop.table(HK\_feelings\_table, 1)\*100

round(HK\_feelings\_table, digits = 2)

Germany\_feelings\_table<- table(German$FEELING, German$COLOUR12)

Germany\_feelings\_table<- prop.table(Germany\_feelings\_table, 1)\*100

round(Germany\_feelings\_table, digits = 2)

Italy\_feelings\_table<- table(Italy$FEELING, Italy$COLOUR12)

Italy\_feelings\_table<- prop.table(Italy\_feelings\_table, 1)\*100

round(Italy\_feelings\_table, digits = 2)

Spain\_feelings\_table<- table(Spain$FEELING, Spain$COLOUR12)

Spain\_feelings\_table<- prop.table(Spain\_feelings\_table, 1)\*100

round(Spain\_feelings\_table, digits = 2)

country.mean <- aggregate(data, by=list(data$COUNTRY),

FUN=mean, na.rm=TRUE)

country.valence <- aggregate(data, by=list(data$COUNTRY, data$VALENCE),

FUN=mean, na.rm=TRUE)

country.arousal <- aggregate(data, by=list(data$COUNTRY, data$AROUSAL),

FUN=mean, na.rm=TRUE)

head(country.arousal)

tail(country.arousal)

###crosstabs 4 <- gender

gender\_table<- table(data$COLOUR12, data$SEX)

gender\_table <- prop.table(gender\_table, 1)\*100

round(gender\_table, digits = 2)

gender.mean <- aggregate(data, by=list(data$SEX),

FUN=mean, na.rm=TRUE)

female\_feelings\_table<- table(female$FEELING, female$COLOUR12)

female\_feelings\_table<- prop.table(female\_feelings\_table, 1)\*100

round(female\_feelings\_table, digits = 2)

male\_feelings\_table<- table(male$FEELING, male$COLOUR12)

male\_feelings\_table<- prop.table(male\_feelings\_table, 1)\*100

round(male\_feelings\_table, digits = 2)

gender.valence <- aggregate(data, by=list(data$SEX, data$VALENCE),

FUN=mean, na.rm=TRUE)

gender.arousal <- aggregate(data, by=list(data$SEX, data$AROUSAL),

FUN=mean, na.rm=TRUE)

gender.valence2 <- aggregate(data, by=list(data$SEX, data$VALENCE),

FUN=mean, na.rm=TRUE)

gender.arousal2 <- aggregate(data, by=list(data$SEX, data$AROUSAL),

FUN=mean, na.rm=TRUE)

head(gender.arousal2)

tail(gender.arousal2)

###1.2. Saturation ~ Valence

model2<- lmer(SATURATION ~ VALENCY + (1|FEELING) + (1|PARTICIPANT), data = data)

summary(model2)

r.squaredGLMM(model2)

plot2 <- ggplot(data, aes(x = VALENCE, y = SATURATION)) +

geom\_point()+

geom\_smooth(method = "lm", se = TRUE) +

theme\_bham\_stats +

labs (x="Valence", y="Saturation") + ylim(0, 100)

pred2 <- effect\_plot(model2, pred = VALENCE,

interval = TRUE,

x.label = "Valence",

y.label = "Saturation (predicted)") + ylim (0, 100) + theme\_bham\_stats

grid.arrange (plot2, pred2, ncol=2)

### 1.3. Brightness ~ Arousal

model3<- lmer(BRIGHTNESS ~ AROUSAL + (1|FEELING) + (1|PARTICIPANT), data = data)

summary(model3)

r.squaredGLMM(model3)

plot3 <- ggplot(data, aes(x = AROUSAL, y = BRIGHTNESS)) +

geom\_point()+

geom\_smooth(method = "lm", se = TRUE) +

theme\_bham\_stats +

labs (x="Arousal", y="Brightness") + ylim (0, 100)

pred3 <- effect\_plot(model3, pred = AROUSAL,

interval = TRUE,

x.label = "Arousal",

y.label = "Brightness (predicted)") + ylim (0, 100) + theme\_bham\_stats

grid.arrange (plot3, pred3, ncol=2)

### 1.4. Saturation ~ Arousal

### 2. VARIATION ACROSS PARTICIPANTS (I): CULTURAL-LINGUISTIC BACKGROUND

###2.1. General trends (BRIGHTNESS ~ COUNTRY) - are there any overall patterns in the colours chosen by participants?

data$COUNTRY <- factor(data$COUNTRY, levels = c("American", "British", "Germany", "Hong Kong (S.A.R.)", "Italy", "Spain"))

data$COUNTRY <- relevel(data$COUNTRY, ref="British")

model5 <- lmer(BRIGHTNESS ~ COUNTRY + (1|FEELING) + (1|PARTICIPANT), data = data)

summary(model5 )

r.squaredGLMM(model5 )

plot5 <- ggplot(data, aes(x=COUNTRY, y=BRIGHTNESS, fill = COUNTRY)) +

geom\_boxplot() +

labs(x= "",y="Brightness") +

theme\_bham\_stats +

scale\_fill\_manual(values = wes\_palette(6, name = "Darjeeling1", type = "continuous"), name = "") +

theme(legend.position="none") +

stat\_summary(fun=mean, geom="point", shape=23, size=5) + ylim(25,100)

pred5 <- effect\_plot(model5, pred = COUNTRY,

interval = TRUE,

x.label = "",

y.label = "Brightness (predicted)") + ylim (25, 100) + theme\_bham\_stats

grid.arrange (plot5, pred5, ncol=2)

###2.2. General trends (SATURATION ~ COUNTRY) - are there any overall patterns in the colours chosen by participants?

data$COUNTRY <- relevel(data$COUNTRY, ref="Spain")

model6 <- lmer(SATURATION ~ COUNTRY + (1|FEELING) + (1|PARTICIPANT), data = data)

summary(model.sat.nationality)

r.squaredGLMM(model.sat.nationality)

plot6 <- ggplot(data, aes(x=COUNTRY, y=SATURATION, fill = COUNTRY)) +

geom\_boxplot() +

labs(x= "",y="Saturation") +

theme\_bham\_stats +

scale\_fill\_manual(values = wes\_palette(6, name = "Darjeeling1", type = "continuous"), name = "") +

theme(legend.position="none") +

stat\_summary(fun=mean, geom="point", shape=23, size=5) + ylim(40,100)

pred6 <- effect\_plot(model6, pred = COUNTRY,

interval = TRUE,

x.label = "",

y.label = "Saturation (predicted)") + ylim (40, 100) + theme\_bham\_stats

grid.arrange (plot6, pred6, ncol=2)

### 2.3 (Brightness ~ Valence\*Country) Are some countries more likely to associate positive words with lighter colours (and negative words with darker colours?)

###2.4 (Saturation ~ Valence\*Country) Are some countries more likely to associate negative words with intense/bright colours (and positive words with less intense/grey-ish colours?)

data$COUNTRY <- factor(data$COUNTRY, levels = c("American", "British", "Germany", "Hong Kong (S.A.R.)", "Italy", "Spain"))

data$COUNTRY <- relevel(data$COUNTRY, ref="Spain")

model8 <- lmer(SATURATION ~ VALENCE\*COUNTRY + (1|FEELING) + (1|PARTICIPANT), data = data)

summary(model8)

r.squaredGLMM(model8)

effects.model8 <- data.frame(effect("VALENCE:COUNTRY", model8))

plot8 <- ggplot(data = effects.model8, aes(x=VALENCE, y=fit, colour = COUNTRY)) +

geom\_line(size=2) +

xlab("Valence") +

ylab("Saturation (predicted)") +

scale\_color\_manual(values = wes\_palette(6, name = "Darjeeling1", type = "continuous"), name = "")+

theme\_bham\_stats

### 2.5 (Brightness ~Arousal\*Country) Are some countries more likely to associate more “intense” words with lighter colours (and more passive words with darker colours?)

data$COUNTRY <- factor(data$COUNTRY, levels = c("American", "British", "Germany", "Hong Kong (S.A.R.)", "Italy", "Spain"))

data$COUNTRY <- relevel(data$COUNTRY, ref="Spain")

model9 <- lmer(BRIGHTNESS ~ AROUSAL\*COUNTRY + (1|FEELING) + (1|PARTICIPANT), data = data)

summary(model9)

r.squaredGLMM(model9)

effects.model9 <- data.frame(effect("AROUSAL:COUNTRY", model9))

plot9 <- ggplot(data = effects.model9, aes(x=AROUSAL, y=fit, colour = COUNTRY)) +

geom\_line(size=2) +

xlab("Arousal") +

ylab("Brightness (predicted)") +

scale\_color\_manual(values = wes\_palette(6, name = "Darjeeling1", type = "continuous"), name = "")+

theme\_bham\_stats

### 2.6 (Saturation ~ Arousal\*Country) Are some countries more likely to associate more “intense” words with brighter colours (and more passive words with greyish colours?)

###lets convert numbers to numerical data

data$VALENCE <- as.numeric (data$VALENCE)

data$AROUSAL <- as.numeric (data$AROUSAL)

data$DOMINANCE <- as.numeric (data$DOMINANCE)

data$HUE<- as.numeric (data$HUE)

data$SATURATION <- as.numeric (data$SATURATION)

data$BRIGHTNESS <- as.numeric (data$BRIGHTNESS)

###crosstabs (colour & experimental condition)

exp\_table<- table(Italy$COLOUR12, Italy$Experimental.condition)

exp\_table <- prop.table(exp\_table, 1)\*100

round(exp\_table, digits = 2)

Italy.feminine <- filter (Italy, Experimental.condition == "feminine")

Italy.masculine <- filter (Italy, Experimental.condition == "masculine")

feminine\_feelings\_table<- table(Italy.feminine$FEELING, Italy.feminine$COLOUR12)

feminine\_feelings\_table<- prop.table(feminine\_feelings\_table, 1)\*100

round(feminine\_feelings\_table, digits = 2)

masculine\_feelings\_table<- table(Italy.masculine$FEELING, Italy.masculine$COLOUR12)

masculine\_feelings\_table<- prop.table(masculine\_feelings\_table, 1)\*100

round(masculine\_feelings\_table, digits = 2)

exp.arousal <- aggregate(Italy, by=list(Italy$Experimental.condition , Italy$AROUSAL),

FUN=mean, na.rm=TRUE)

tail(exp.arousal)

##lets now subset Italian men & women

Italy.female <- filter (Italy, SEX == "female")

Italy.male <- filter (Italy, SEX == "male")

exp.arousal.female <- aggregate(Italy.female, by=list(Italy.female$Experimental.condition , Italy.female$AROUSAL),

FUN=mean, na.rm=TRUE)

exp.arousal.male <- aggregate(Italy.male, by=list(Italy.male$Experimental.condition , Italy.male$AROUSAL),

FUN=mean, na.rm=TRUE)

###colours for female and feminine, female and masculine, etc.

Italy.female.feminine <- filter (Italy.female, Experimental.condition == "feminine")

Italy.female.masculine <- filter (Italy.female, Experimental.condition == "masculine")

Italy.male.feminine <- filter (Italy.male, Experimental.condition == "feminine")

Italy.male.masculine <- filter (Italy.male, Experimental.condition == "masculine")

female\_feminine\_table<- table(Italy.female.feminine$FEELING, Italy.female.feminine$COLOUR12)

female\_feminine\_table<- prop.table(female\_feminine\_table, 1)\*100

round(female\_feminine\_table, digits = 2)

female\_masculine\_table<- table(Italy.female.masculine$FEELING, Italy.female.masculine$COLOUR12)

female\_masculine\_table<- prop.table(female\_masculine\_table, 1)\*100

round(female\_masculine\_table, digits = 2)

male\_feminine\_table<- table(Italy.male.feminine$FEELING, Italy.male.feminine$COLOUR12)

male\_feminine\_table<- prop.table(male\_feminine\_table, 1)\*100

round(male\_feminine\_table, digits = 2)

male\_masculine\_table<- table(Italy.male.masculine$FEELING, Italy.male.masculine$COLOUR12)

male\_masculine\_table<- prop.table(male\_masculine\_table, 1)\*100

round(male\_masculine\_table, digits = 2)